

THE REVIEW

Published monthly except July and September by the

American Society for Metals
7301 Euclid Ave., Cleveland, O.

BRADLEY STOUGHTON, *President*
HERBERT J. FRENCH, *Vice-President*
W. H. EISENMAN, *Secretary*
FRANCIS B. FOLEY, *Treasurer*

Trustees

E. L. BARTHOLOMEW K. R. VAN HORN
C. Y. CLAYTON N. F. TISDALE
OSCAR E. HARDER, *Past President*



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RAY T. BAYLESS.....*Editor*
M. R. HYSLOP.....*Managing Editor*

Cleveland, O., January, 1942
Volume XV No. 1

Molybdenum and Vanadium Stressed In Two Alloy Talks

Reported by E. J. McKnight
Giffin Wheel Co.

Rocky Mountain Chapter kept abreast of the times at the October and November meetings by lending its ears to two fine talks.

A. W. Demmler, metallurgical engineer, Vanadium Corp. of America, spoke at the October meeting with the subject "Alloy Steel Application", and Carl Loeb, vice-president of Climax Molybdenum Co., at the November meeting on "Alloy Steels".

Each speaker stressed the availability of the particular alloy in which he was interested—vanadium being mined in northern South America and in the United States, and molybdenum being dug out of Denver's back yard at Climax, Colo.

Hardenable Increased

Mr. Demmler brought out that vanadium is more often used in conjunction with other alloys than independently, and in this connection the effects of vanadium on grain size in steel and fatigue, as well as other mechanical properties, were pointed out.

Along the line of new developments he called attention to the growing application of special process alloys of vanadium, titanium, aluminum and zirconium, which effect considerable increase in hardenability even in fine-grained steels; thus, high strengths are obtainable, yet toughness is insured.

S-Curve Takes Beating

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Edward W. Milligan of Kistler Stationery Co. showed slides of some of the old Colorado mining camps and told interesting tales in connection with them at the November meeting.

Original Rockwell Tester Is Presented To A.S.M. for Sauveur Memorial Room

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Committee Reports On Progress of Sauveur Memorial

(Continued from page 1)

from individual and chapter contributions. Accordingly, the various chapters were contacted and were asked to contribute as chapters and to permit solicitations of their membership.

The response to the requests has been gratifying. As of September 18, 1941 the sum of \$3354 had been received. The sum of \$568 has been expended in connection with mailing requests to the Society membership leaving the fund a few hundred dollars short of its goal. It is believed that this shortage will be readily made up.

At a meeting in Philadelphia on Oct. 19, 1941, it was decided to proceed with the execution of the plans as outlined, trusting to additional contributions to make up the apparent deficit.

While funds were being collected, the question of the selection of a suitable artist for the execution of an oil painting of Sauveur was under active consideration. In this matter advice has been sought from 14 sources including the directors of various art galleries and museums of art.

In the above study, of course, the wishes of Mrs. Sauveur and her daughters have been consulted. The result, arrived at by process of elimination, has been the recommendation of Alexander James as the outstanding portrait artist in America.

At the meeting of the Committee in Philadelphia on Oct. 19, 1941, a motion was passed that "The national secretary, the president of A.S.M., and the chairman of this Committee be empowered to obtain plans, and with the approval of the Board of Trustees go ahead with the furnishing of the room with the money remaining after the cost of the portrait has been deducted." Respectfully submitted,
H. H. LESTER, *Chairman*

Hydrogen Evolution Builds Pressure, Causes Cracks

(Continued from page 1)

are discontinuous, which possibly means that there is space for the evolution of the hydrogen. The hydrogen under sufficient pressure will force the mosaic blocks apart and in this way give a brittle fracture.

Numerous slides of photomicrographs illustrating "snowflakes," "fisheyes," and "silver streaks" were shown. These faults were obtained experimentally by welding and pickling as well as by holding in a hydrogen atmosphere. It was shown that after removal of hydrogen from the steel these phenomena did not occur.

The effect of hydrogen in steel with respect to protective coatings was well illustrated. Numerous experiments were described which illustrated the deleterious effects of the hydrogen. Thus to get a protective coating to adhere the hydrogen must first be removed from the steel.

to demonstrate his invention is also being given to the A.S.M. and will be placed in the Museum alongside the first manufactured machine.

This machine was sold to John Royle and Sons, Paterson, N. J., on June 14, 1921, and was in continuous service from that date until Oct. 16, 1939 when Wilson Mechanical Instrument Co. persuaded the user to return it and accept machine No. 10,000.

Many requests and suggestions as to its ultimate disposal have been received, but C. H. Wilson, president of the Wilson Company, in presenting the instrument to the A.S.M., writes as follows:

"The metallurgists and the other men engaged or interested in the heat treatment or working of metals and who form the membership of the American Society for Metals, by employing 'Rockwell' testers in their work, were responsible for the volume of business that induced the continuous evolution in design and improvements in method of production that have brought this tester to its present stage of usefulness. Therefore, no other museum in this country, or anywhere else, is entitled to the first 'Rockwell' hardness tester now that the American Society for Metals desires to have it."

Tisdale, Holden at Oregon

Reported by Colin Chisholm
Salesman, Columbia Steel Co.

Oregon Chapter—Norman F. Tisdale, vice-president and metallurgical consultant of the Molybdenum Corp. of America, and a national trustee of the A.S.M., was a guest at the meeting on Nov. 19. He outlined the work that is being done by the Society in organizing A.S.M. War Products Advisory Committees.

Guest speaker of the evening was A. F. Holden, president of the A. F. Holden Co., who gave an extremely interesting address on the history, development and use of salt baths. At the conclusion of his talk Mr. Holden answered a great number of questions concerning the application of salt baths.

Atmosphere Cost Varies, Economical Selection Requires Careful Study

Reported by E. J. Wellauer
Metallurgist, Falk Corp.

Milwaukee Chapter—"Furnace Design and Furnace Atmosphere" was the subject of a talk by L. M. "Bill" Lindsey on Nov. 18. Mr. Lindsey is director of engineering sales and assistant to the president of General Alloys Co.

The various types of atmospheres used in commercial heat treatment were discussed from the viewpoints of properties, uses, generation and cost. It was particularly noted that a considerable difference in cost exists between the atmospheres of various properties, indicating that the most economical selection for a given use must be determined by a careful study.

The effect of the various alloys when exposed to different atmospheres was discussed along with the effect of design on life. Illustrations were given of successful performances of furnace trays in which the rollers were on the tray instead of in the furnace.

Suggestions were made pertinent to the possibility of increasing performance and furnace loading by means of proper lubrication with colloidal graphite. A paste of graphite and oil is used to facilitate application, the oil burning out, leaving the graphite for lubrication at high temperatures.

Tenfold Growth In 2 Years in Stainless Welds

Reported by Amos D. McGary
Metallurgist, International Chain Co.

York Chapter—Speaker on Dec. 10 was one of the local members, Edward J. Brady, vice-president and general manager, Alloy Rods Co.

In clear, concise language Mr. Brady began his talk with some astounding facts concerning stainless welding, not generally known.

In the city of York, two producers of stainless rods manufacture about one third of total U. S. production. Stainless welding has grown from 80,000 to 800,000 lb. per month in a period of two years.

The normal consumption of stainless comprises a wide variety of uses, but these, at the present time, have been severely curtailed due to defense measures.

Coated Rods Used

Stainless welding is best carried out with coated rods. These coatings are not patented but each producer has his own secret coating formulas which are often quite complex.

The welding process is generally carried out with d.c. current although a.c. current may be used. The temperature of the arc is 5000 to 8000° F. and the temperature of the weld metal is 3500° F.

Are welding is a complete cycle of electric furnace melting in miniature—the coating, which is slow burning, forms an inverted crucible of the molten globules of weld metal. The complete cycle of solid rod to molten globules of weld metal takes place in 5 to 20 sec.

Austenitic Steels for War Implements

The austenitic group of stainless steels is the most widely used weld material because of its non-magnetic and non-hardening properties.

The ferritic group does not respond to heat treatment nor does annealing refine grain size, but annealing may relieve some internal strains.

The austenitic steels have remarkable ballistic properties, and for this reason have displaced riveted structures for use in all of the mechanized implements of warfare.

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Sustaining Members and National Officers Honored

Reported by Gregory F. Baumann
Foreman, Gruen National Watch Case Co.

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George H. Gerdes, chairman of the Chapter, called the meeting to order and announced the subjects to be discussed would be "Metals, Metallurgists and the Defense Program". Guests of the evening were Prof. Bradley Stoughton, president of the National Society and Bill Eisenman, national secretary.

Mr. Eisenman told of the plans for A.S.M. War Products Advisory Committees to assist in the present emergency, and made clear the importance of the Chapter in helping our country.

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Built-up Edge Study Applied To Cutting Oils

Reported by Walter M. Saunders, Jr.
Consulting Chemist and Metallurgist

Rhode Island Chapter—A study of the built-up edge on tools, carried out by several investigators over a period of years, has resulted in removing much of the mystery connected with the selection of suitable sulfurized and chlorinated cutting oils, according to James T. Beard, staff engineer, Industrial Engineering Division, Socony-Vacuum Oil Co., Inc., New York.

The mysteries of the use of these cutting oils were also done away with by Mr. Beard's talk on Dec. 3, the subject being "Relation of Built-up Edge to Tool Life, Finish and Selection of Cutting Oils".

Movies Define Built-up Edge

To show what the built-up edge is, why it is formed, and that it is more prevalent on the "draggy", ductile metals, than on the clean cutting, or more brittle, metals, Mr. Beard brought with him the excellent moving pictures made by General Electric Co.

These movies of planer operations, taken in slow motion and with a microscope, so clearly illustrate the distorting action of the tool on the metal, the formation of built-up edge, and the benefits of cutting oils, that their educational value is of an exceptionally high quality.

Mr. Beard compared the lubrication of a tool cutting metal to that of a journal in a bearing. With a tool, however, the pressure of the chip on the lip is terrific, being sometimes as high as 350,000 psi.; there is the more or less erratic behavior of the built-up edge; and finally, radial pressures on the nose of the tool introduce an additional area requiring lubrication.

Properties Desired in Oil

The severity and variations in these conditions determine what properties are desirable in a good cutting oil. Satisfactory oils have adequate extreme-pressure ingredients, like sulphur and chlorine, or compounds of these elements; adequate anti-weld constituents, again sulphur or chlorine; and lastly, lubricating characteristics, which are obtained from fatty oils, either vegetable or animal, preferably the latter.

There are three principal kinds of sulphur—the natural sulphur in mineral oils; the high-sulphur mineral oils to which sulphur has been added; and the mineral oils containing sulfurized fats. Natural sulphur is not as effective as added sulphur, and sulphur combined with the fat is in many cases best, according to field and laboratory tests, where effectiveness is judged by the life of the tool, finish, and chaser wear.

Cartoonist Entertains

In the discussion period, Mr. Beard stated that the theory of a space between lip of tool and chip has been exploded; that there might be cause for believing in the gasification of sulphur and chlorine compounds under the extreme heat of cutting; and that corrosive properties of cutting oils must be taken into consideration for specific applications.

Allan W. Halladay, cartoonist for the Providence Journal entertained with rapid-fire cartoons, and a talk on modern cartooning, at the dinner preceding the meeting. Last, but not least, National Secretary Bill Eisenman's presence at the meeting was greatly enjoyed.

Speakers at Boston's December Meeting



V. Homerberg was Technical Chairman at the Dec. 5th Meeting, Boston Chapter

B. Clements, of Wright Aeronautical Corp., Gave the Main Talk on Aircraft Materials

Lt. Col. Charles T. Cahill Demonstrates "The Shoe in Romance and History" as the Coffee Talk

Stainless Steels Are Corrosion Resistant, Not Corrosion-Proof Baltimore Warned

Reported by R. C. Dalzell
Revere Copper and Brass, Inc.

Baltimore Chapter—At the November meeting Stanley P. Watkins, manager, sales development, Rustless Iron & Steel Corp., presented the up-to-date picture on the stainless steels.

He pointed out that although there are over 60 different stainless steel alloys commercially available, the bulk of the tonnage is produced in 14 grades. For an industry only 16 years old, the growth has been tremendous. Production last year was over 250,000 tons of ingot, and for 1941 may be twice that.

Growing knowledge of the properties of these alloys is evidenced by the warning that they are corrosion resistant—not corrosion-proof. Prospective users are urged to consult producers for data on any particular corrosion resisting application.

After a discussion of welding, Mr. Watkins gave some very interesting observations with reference to machining. He emphasized that (a) tools should be sharp and as smooth as possible, (b) slow speeds are necessary with the exception that free-machining grades may use up to 80% of the speed used for ordinary steels, (c) take a heavy cut and keep cutting.

The methods and advantages of a recently developed process for electrolytically polishing stainless steels were covered briefly in his talk and in more detail in the discussion after the talk.

There was also considerable interest displayed in his description of nitriding as a means for increasing the surface hardness of stainless steels. He reported that all stainless steels respond to this treatment and that hardnesses of above 850 Vickers are readily obtained.

In the current defense program the stainless steels are playing an important role, and because of this sales are restricted to uses having a priority rating of A-10 or better.

The 18-8 mixture is used for aircraft exhaust manifolds, fire-walls, cable fittings, bolts, nuts, rivets, and bomb racks. This grade is also used for important parts of bomb sights. Hundreds of 18-8 hose clamps are used on each good sized airplane.

The straight chromium grades are also being used extensively for turbine blades in steam turbines, aircraft engine parts, fuze assemblies, hydraulic valve plungers, valve trim, and many more applications.

The meeting was concluded with a

Movie of Wright Plant Follows Talk on Engines

Reported by Paul D. Ffield

Materials Engineer, Bethlehem Shipbuilding Corp.

Boston Chapter—The Dec. 5th meeting at M.I.T. featured a talk on "Aircraft Engine Materials" by B. Clements, metallurgist, Wright Aeronautical Corp.

Mr. Clements' talk emphasized the importance of selection and inspection of materials and was accompanied by an interesting set of slides showing the various parts which make up an aircraft engine.

The talk was followed by a motion picture of one of the Wright plants, showing the many fabrication, inspection, assembly, and testing operations required for the manufacture of these engines.

V. O. Homerberg served as technical chairman in the active discussion which followed the presentation of the talk.

An interesting coffee talk on "The Shoe in Romance and History" was presented by Lt. Col. Charles T. Cahill, publicity manager, United Shoe Machinery Corp. Lt. Col. Cahill brought with him shoes of many sizes and shapes that illustrated the development of footwear through the ages.

Army and Navy Men Introduced at Oregon

Reported by Colin Chisholm
Salesman, Columbia Steel Co.

Oregon Chapter—Lieutenant A. F. McGarr of the Army Ordnance Department was introduced at the Christmas meeting on Dec. 12. Lt. McGarr stated that he had just recently arrived in Portland and it is his job to check plants as to their suitability for ordnance work.

He said that he was particularly gratified to hear that the A.S.M. was forming a committee to assist such plants by, giving advice and suggestions on metallurgical problems.

Chairman Thomas then introduced Eason G. Miller of the Naval Inspection Service, who gave a brief resume of his duties in this connection and emphasized that he and his staff wanted at all times to help concerns who were working on naval contracts.

Ray Neils presented the retiring chairman, G. E. Healy, with an A.S.M. chairmanship certificate and a blanket in appreciation of his services.

The balance of the evening was devoted to a Christmas party.

concert given by the 35 members of the Baltimore City College Glee Club (a high school). They gave an outstanding performance.

Traces History of Metallography, High Power Applications

Reported by J. M. Gotshall

Asst. Chief Chemist, Timken Roller Bearing Co.

Canton-Massillon Chapter—F. F. Lucas, research microscopist of Bell Telephone Laboratories, the principal speaker, addressed the group on "High Power Metallography" on Dec. 11.

Dr. Lucas commenced his talk with the lives and times of Leeuwenhoek and Hooke in the seventeenth century. Leeuwenhoek was the first man in history to discover a world of living things below the vision of man and Robert Hooke became the world's first metallographer.

Hooke was commissioned by the Royal Society to look into the reported marvelous discoveries of Leeuwenhoek and in so doing he built a compound microscope which he applied to a razor blade among countless other things.

Dr. Lucas traced the development of the microscope to modern times and showed how it had been applied in furthering man's knowledge of the structure of matter. He then discussed and illustrated the development of high power metallography and the ultra violet microscope.

The ultra violet microscope, originally developed about 1900 for biological research, was abandoned because it was too complicated for practical use. The Bell Laboratories revived it in 1924 for metallography, found it rather impractical for the study of metals but did learn how to apply the instrument to the study of living things.

It has since been widely used in biological and industrial research because of its very high resolving power.

Motion pictures of the 1941 Canton-Massillon football game were shown and the coaches, both of whom were present, gave short coffee talks.

Fundamental Principles Emphasized in Talk on Heat Treating Alloy Steels

Reported by Robert D. Stout
Lehigh University

Lehigh Valley Chapter—In discussing "The Heat Treatment of Alloy Steels", G. V. Luerssen of the Carpenter Steel Co. emphasized the fundamental principles which are involved.

Using a simple analogy, he explained the roles played by the quenching medium, the transformation rate of the steel, and the mass. The specific effects obtained from additions of each of the various alloying elements were enumerated.

The interested discussion which followed was a tribute to the speaker and to the fundamental nature of his talk. As Mr. Luerssen pointed out, discussions of this kind do much to dispel common misconceptions that grow in our minds without our realizing it.

R. L. Deily brought up the question of hardenability tests and their utility. The causes of cracking of thin sections in hardening were considered at some length.

R. D. Stout pointed out that the maximum attainable hardness and strength of small sections depends only on carbon content (up to 0.60% C) and reviewed the effects of undissolved carbides on depth of hardening as presented by Mr. Luerssen in a paper given as a part of the Hardenability Symposium of 1938.

R. L. Deily of the Bethlehem Steel Co. stepped in as an emergency coffee talker at dinner, and gave a most interesting description of his first sea voyage as a member of the crew.

ASM-WAR PRODUCTS ADVISORY COMMITTEES

A War-time Service Free To Industry

ASM Enlists for the Duration;
Victory Demands Speed

NOW THAT America must be the arsenal of victory, production must be "given the gun". Victory demands speed. It demands all the knowledge and resources of industry.

Because so many metal problems are involved in war-time production, the local chapters of the American Society for Metals have organized War Products Advisory Committees as a free advisory service for the metal producing and metal working industries.

These Advisory Committees are made up of the outstanding metallurgical and manufacturing experts in each area. They are backed by the entire membership of the local chapter. They have on call also all the technical experience and resources of the 14,000 members of the American Society for Metals, whose national Board of Trustees has recommended the nationwide organization of Advisory Committees by each of the 52 chapters of the Society.

These chapters have served the metal industry in their respective areas for many years with technical programs and educational courses. They welcome this further opportunity to serve every war products manufacturer or the manufacturer of equipment or materials used in production of war materiel—without any cost or obligation whatsoever.

Scope of Service

The services of these ASM-War Products Advisory Committees are available to all manufacturers engaged, or about to engage, in war-time production. Whether you are a small manufacturer or a large company with a trained metallurgical or engineering staff, the assistance of these Committees is yours for the asking.

Your problem may involve the interpretation of specifications, or the effect of these specifications.

Your problem may involve metallurgy, engineering, design or production—it may involve steel or non-ferrous metal production, machining, heat treatment, welding, finishing or some other step in fabrication.

In any case, the extensive, diversified ability and training of these Advisory Committees' personnel, backed by the combined experience of the A.S.M. membership, will be a potential source of assistance to you.

While these Committees cannot perform investigations or laboratory research, they can contribute helpful suggestions to practically every problem of metal manufacture and fabrication. The experience and judgment that have solved so many metal problems in the past are yours for the asking.

How to Proceed

These ASM-War Products Advisory Committees will meet regularly. Every war products manufacturer, either prime, secondary, or contributing, is invited to avail himself of these meetings.

If you have a problem, do not hesitate.
(Continued in Column 4)

Consult your Local Advisory Committee

ANY MANUFACTURER with a metallurgical or manufacturing problem is invited to get in touch with his local committee as listed below. Write or phone the coordinator, chairman, or secretary as indicated. Do not hesitate to make use of this free service—there is no obligation.

Canton-Massillon ASM-WPAC

E. S. Rowland, *Coordinator*,
Assistant Metallurgist
Timken Steel & Tube Co.

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Field of Service Covers Wide Scope

ALL THESE phases of metallurgical and manufacturing production are shown here to give you an idea of the wide scope of service for which the ASM-War Products Advisory Committees are equipped. This is only a partial outline of the broad field both ferrous and non-ferrous, in which the ASM-WPAC can assist you.

Read it carefully. File it for future reference. Do not hesitate to use this free service, if there is the least chance your local committee can be helpful. Remember—your problems are our problems.

Melting—Ferrous and Non-Ferrous
(a) Methods; (b) Ingot and casting practices; (c) Refractories; (d) Furnaces and equipment.

Hot Working
(a) Rolling; (b) Forging; (c) Piercing; (d) Extrusion.

Cold Working
(a) Cold drawing; (b) Swaging; (c) Coining; (d) Cold heading.

Physical and Mechanical Properties
Heat Treatment
(Including Wrought and Cast Products)

Industrial Furnaces and Fuels
Flame Hardening and Annealing

Induction Heating
(a) Hardening; (b) Melting.

Case Hardening
(a) Carburizing; (b) Cyaniding; (c) Nitrogen case hardening methods.

Heat Treating Equipment
(a) Refractories; (b) Pyrometry; (c) Lead baths; (d) Salt baths; (e) Quenching equipment and media.

Machining
(a) Tool steels; (b) Cemented carbides; (c) Cutting fluids; (d) Tool design.

Welding
(a) Welding methods; (b) Testing and inspection methods for welds and welded products; (c) Gas and electric arc cutting of metals.

Soldering and Brazing
Cleaning Methods
(a) Alkaline solutions; (b) Vapor degreasing; (c) Pickling; (d) Electrolytic pickling; (e) Blast cleaning; (f) Tumbling, rolling and barrel burnishing.

Surface Finishes
(a) Electroplating; (b) Polishing; (c) Buffing; (d) Coloring; (e) Galvanizing; (f) Sprayed metal coating; (g) Painting, lacquering and jappanning.

Cladding Methods and Materials
Die Castings
Testing and Inspection
(a) Testing methods; (b) Inspection methods; (c) Specifications.

(Continued from Column 1)

tate to contact your local committee. Telephone as directed and arrangements for your conference with the Advisory Committee will be made and detailed instructions given as to what material should be brought to the conference for a better understanding of your problem.

If a solution cannot await the next regular meeting of the ASM-WPAC, endeavor will be made to secure more immediate action by other methods.

In any event, whether you attend the regular meetings, whether you phone or write, rest assured that your request for assistance or consideration of a problem will be handled confidentially—it will be a matter of record between yourself and the committee only.

No Red Tape—No Expense

Let it be emphasized that the work of the ASM-War Products Advisory Committees is solely a contribution to present war-time efforts. No financial considerations will be involved. You need not be a member of the American Society for Metals to obtain this service. You will not be solicited for membership.

This is a sincere effort on the part of the chapters of the ASM to make a valuable contribution to "Ultimate Victory".

Necessity for Standardization Of Steels Seen

Reported by Richard Grinnal
International Harvester Co.

Chicago Chapter—The November meeting was designated as Past Chairmen's Night. Following the dinner, Chairman W. D. McMillan presented each one with an appropriate gift.

Those honored were Adam Steever, Walter Mathesius, Marc Grossmann, Harvey Anderson, Harry Knowlton, E. Gammeter, W. Remmers, H. Van Vleet and Roy Roshong.

One of the past chairmen, Harvey Anderson, delivered the coffee talk. Mr. Anderson, who is with the OPM at present, discussed the present situation of the important metals on the priorities list.

Chapter Given A.S.M. Archives

W. E. Williams presented the chapter with a complete set of archives of the A.S.M. and reviewed briefly the founding and early history of the organization.

In his address on "Standardization, Simplification, and Substitution of Steels", H. B. Knowlton, also a past chairman of the Chicago Chapter, dealt with a subject of great current interest.

Because of the difficulty of obtaining most of the alloying elements, many of the specifications for alloy steel for use in non-defense items must be changed. Steel producers are finding it increasingly difficult to produce many of the special alloy steels which the users have been accustomed to buy.

Another problem confronting the steel mills is the large number of steels demanded by industry. Higher production and a greater degree of accuracy could be obtained by the steel mills if industry could agree upon a small list of standard steels.

Britain Limited to 80 Steels

Knowlton mentioned that England is said to have limited wartime production to 80 steels including tool steels, while steel producers in the United States are asked by buyers to supply about 4000 different types, many of which vary only slightly in composition.

The S.A.E. recognizes about 200 different steels. The new A.I.S.I. list contains more than 200 specifications, but considerably less than 4000.

Many of our high alloy steels are used in applications where they are not really necessary. In most cases, designers have specified their use to provide a safety factor, but more careful or complete analyses of their problems might show that low alloy or plain carbon steels could be successfully substituted.

Designers of defense equipment in some cases have also been guilty of extravagant uses of alloys. Several specific examples were given to show how even slight modifications in design might make the use of a lower alloy or even a plain carbon steel permissible.

It was brought out that shortage of alloying elements might make it necessary to produce new types of steel as substitutes for the present S.A.E. alloy steels. There is a danger, however, that the number of substitutes proposed may be greater than the number of alloy steels now being specified.

There is a need, therefore, for the producers, the users and the technical society committees to cooperate in the selection of a small list of alternative steels which may be used in place of the present S.A.E. alloy steels.

Some discussion was given of the methods of interpreting data on hardenability and physical properties.

Feature Abrasives, Machining at Ontario



Francis D. Bowman (Left), Advertising Manager for the Carborundum Co., Presented a Sound and Color Movie on "The Story of the Service of Abrasives in Industry" at the December Meeting of the Ontario Chapter Held at the Royal York Hotel, Toronto. W. H. Oldacre (right), president and director of research, D. A. Stuart Oil Co., spoke on "Machinability of Metals as Affected by Cutting Fluids"

Function of Sulphur in Cutting Oils Is To Act as Anti-Weld at Chip-Tool Contact

Reported by G. L. White

Editor, Canadian Metals & Metallurgical Industries

Ontario Chapter—The last meeting for the year 1941 was held on Dec. 5, at the Royal York Hotel, Toronto, with over 190 in attendance. W. H. Oldacre, president and director of research, D. A. Stuart Oil Co., Chicago, spoke on "The Machinability of Metals as Affected by Cutting Fluids".

8000 Machined Parts in Plane

In opening his address, Mr. Oldacre referred to the importance of machining in war production. He pointed out that an airplane may contain some 8000 precisely machined parts, and illustrated the great weight of chips which may be produced in relation to the finished part, with the modern rifle as an example.

For many years industry has done a good job of metal cutting without understanding even the simpler fundamentals of the art. With the aid of slides Mr. Oldacre discussed the progressive steps that have been made, and, assisted by photomicrographs and diagrams, developed a theory explaining the actual action of metal cutting tools.

Soluble Oils as Coolants

Under certain conditions there is contact between the chip and the tool at surfaces of practically nascent metal and under these circumstances cutting oils having high anti-weld properties such as are conferred by sulphur are of benefit. Sulphur enters into many oils and practically its whole purpose is to function as an anti-weld.

Reference was made to various types

of testing machines that have been used to study the anti-weld properties of oil.

Soluble oils have important applications as coolants but it was pointed out that soluble oils do not function as efficient coolants at temperatures above the boiling point of water.

In grinding operations hotter contacts result with soluble oil than with straight grinding oil and thus, with the former compound, grinding checks are more prone to develop.

In the discussion period, oil dermatitis was considered and it was shown that only oil acne could be definitely attributed to the oil. This type of dermatitis is not a case of infection but of interference by the oil with normal healing processes of the skin.

In preventing infection, disinfectants should be used for scrubbing stair rails, etc. in the plant, while cutting compounds may be sterilized by heating to 180° F. over night, metal chips settling out during the operation.

A feature of wide interest was the color and sound movie "The Story of the Service of Abrasives in Industry" presented by Francis D. Bowman for the Canadian Carborundum Co.

Molybdenum Steels Have Wide Field if Properly Hardened

Reported by John P. Beal, Jr.
Metallurgist, Universal-Cyclops Steel Corp.

Northwestern Pennsylvania Chapter—"Discouragement of the fear of molybdenum high speed steels" was the theme of a talk given by Norman I. Stotz of the Universal-Cyclops Steel Corp. at the Lafayette Hotel in Meadville on Nov. 13.

Mr. Stotz, who is on the Tool Steel Committee of the OPM, traced the development of moly high speed tool steels from their inception some ten years ago at the Watertown Arsenal to the present time.

During the course of his talk, Mr. Stotz showed why the adoption of moly high speed steels had been rather slow and why it is essential they be adopted now in this emergency.

The high point of the speaker's talk was his description of the various general types of moly high speed steels, their best applications, and their heat treatment.

He pointed out that the treatment of all these steels with the exception of temperature is the same and continued with a discussion of ways to prevent surface decarburization by the use of surface paints, controlled atmosphere furnaces, and the use of salt baths in hardening, pointing out the virtues and disadvantages of the various methods discussed.

To encourage the use of moly steel Mr. Stotz pointed out that in an OPM symposium there was no case offered in which moly high speed steels could not successfully replace tungsten high speed steels. He was, however, careful to point out that to do this the moly steels must be hardened correctly.

In conclusion, the speaker advised purchasers of moly high speed steels to consult the manufacturer of the steel for the best type to be used for his job, not to pick the steel from the analysis that he thought should work.

Compliments are due Mr. Stotz for the excellent and forceful way in which he presented this subject.

FORGING HANDBOOK

by Waldemar Naujoks and Donald C. Fabel

This 630-page book is more than a handbook on forging methods and forgings. It is a valuable reference on forged metals—their proper use, physical properties and production records.

Problems in forging design—helpful to the design engineer, metallurgist, and production man—are discussed and illustrated by drawings and photographs.

If your plant uses forged parts . . . if you produce metals for forgings . . . if you want to increase your knowledge of conditions in a typical metal working industry . . . order the FORGING HANDBOOK today!

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Gentlemen:

Please send me a copy of the Forging Handbook. I am attaching check (), money order (), cash () for \$7.50.

Name
Company
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Talk on Silvery Pig Iron Is Available to Chapters

Jackson Iron and Steel Co. of Jackson, Ohio, has notified A.S.M. headquarters that a brief talk is available for any engineering group, entitled "The Story of Silvery Pig Iron". It is illustrated with 40 lantern slides and should be well adapted for chapter meetings.

Bradley H. Booth, metallurgist for Jackson Iron and Steel Co., can generally present the talk in person, but chapters at distant points such as the West Coast, which he cannot conveniently reach, can secure the slides and a printed copy of the talk for reading by one of their own members.

The talk takes about an hour to present although this can be shortened if necessary. Mr. Booth will bring along samples of pig iron and ores to illustrate materials mentioned.

Further information can be obtained by addressing Mr. Booth at the company's office in Jackson, Ohio.

SECTION HEADINGS

The Forging Industry
Forge Plant Equipment
Die Block and Process Operations
Forge Dies and Tools
Forging Practice
Finishing Operations
Heat Treatment of Forgings
Cleaning of Forgings
The Testing and Inspection of Forgings
Materials Handling
Forge Plant Design
Forge Plant Maintenance
Furnaces and Furnace Design
Designing the Forged Part
Forging Materials
Job Estimating
Costs and Cost Engineering
Forge Shop Safety
Forging Definitions
Mathematical Tables and Data

What's New in Manufacturers' Literature

Blades for inserted tooth milling cutters and lathe tools with full width tips, made of Tung "G", are listed in two new bulletins issued by Vascology-Ramet Corp., Tung "G" is a non-ferrous alloy containing tantalum carbide developed especially for borderline machining applications between the ranges of high-speed steel and cemented carbides. Bulletin Af-332.

"Cutting Fluids" is the title of attractive new booklet published by Standard Oil Co. of New Jersey. Selection of cutting fluids, suggestions for handling them and a brief history of past and present practices in their use are presented. Bulletin Af-333.

Cutting Tools. Firth-Sterling Steel Co. Bulletin Le-172.

Metal Saw. Wells Mfg. Co. Bulletin He-316. Handee Tool. Chicago Wheel & Mfg. Co. Bulletin Le-230.

Contour Machine. Continental Machines, Inc. Bulletin Ee-170.

Handling Problems. American Monorail Co. Bulletin Jc-318.

Cutting Oils. Cities Service Oil Co. Bulletin Ee-113.

High Production Stamping Machine. Chambersburg Engineering Co. Bulletin Ge-132.

Cutting Oil Handbook. D. A. Stuart Oil Co. Bulletin Ke-118.

Hardsteel Drills. Black Drill Co. Bulletin Ne-328.

1942 Line of Thor Portable Electric Tools is described in an attractive new 64-page catalog just issued by the Denison Engineering Co. This book is a helpful guide to the selection of proper equipment for various types of work. Bulletin Af-334.

Presses for powder metallurgy are described in new and complete 48-page catalog issued by F. J. Stokes Machine Co. Valuable reference information is presented. Bulletin Af-335.

How present presses can be adapted to new requirements is shown in two new bulletins published by the Independent Pneumatic Tool Co. These bulletins are really shop tips that will be helpful to readers confronted with change-over operations. Bulletin Af-336.

Kennametal steel cutting tool catalog. 32 pages by McKenna Metals Co. Bulletin Ke-238.

Carbon Tool Steels, their heat treatment, range of applications and tool design, are described in a new 8-page booklet by Jessop Steel Co. Bulletin Af-173.

Engineering and testing laboratory data on "Five-Point" Decphard Steel are presented in a new bulletin published by Foote Bros. Gear & Machine Corp. Bulletin Af-244.

Designing greater sales appeal with stainless steel. 8-page booklet by Carpenter Steel Co. Bulletin Ne-12.

Hard Facing Alloys. Wall-Colmonoy Corp. Bulletin Kd-85.

Free Machining Steels. Monarch Steel Co. Bulletin Cd-255.

Alloy Steels. Copperweld Steel Co. Bulletin Ge-311.

Tool Steels. Bethlehem Steel Co. Bulletin Ce-76.

Die Steels. Latrobe Electric Steel Co. Bulletin Ld-208.

Steel Data. Vanadium-Alloys Steel Co. Bulletin Kd-294.

Uses and properties of molybdenum steels and irons. 125-page book by Molybdenum Corp. of America. Bulletin Ge-312.

Nitralloy Data Book. Nitralloy Corp. Bulletin Ke-116.

NAX high tensile low alloy steels. 20-page booklet by Great Lakes Steel Corp. Bulletin Kd-229.

Newly-Revised and Enlarged Graphitic Steel Booklet, issued by Steel & Tube Division, Timken Roller Bearing Co. Bulletin Ne-71.

Physical Characteristics chart on the Elastal group of machinery steels by Horace T. Potts Co., Brown-Wales Co., and Beals, McCarthy & Rogers. Bulletin Ed-264.

Government specifications for carbon steels, a new chart by Peter A. Frasse & Co. Bulletin He-172.

Inland Steel Co.'s enameling iron sheets are described in Bulletin Ld-295.

Stainless-clad steel is comprehensively described by Ingersoll Steel & Disc Div., Borg-Warner Corp. Bulletin Ke-253.

Loose-Leaf reference book on molybdenum steels and their applications, by Climax Molybdenum Co. Bulletin Hb-4.

Crucible Steel Co. of America describes three molybdenum grades of high speed steels in Bulletin Ge-56.

24-page booklet describes molybdenum-tungsten high speed steels, by Cleveland Twist Drill Co. Bulletin Ld-103.

Five metals for spring purposes are described by International Nickel Co. Bulletin Ke-45.

Platinum metal catalysts are discussed comprehensively in a new booklet just issued by Baker & Co., Inc. Bulletin Af-337.

Complete line of Ledalloy, self-lubricating bearings are described in a new 36-page catalog published by the Johnson Bronze Co. This catalog will be particularly helpful to metallurgical men interested in design. Bulletin Af-237.

Aluminum Castings. National Bronze & Aluminum Foundry Co. Bulletin De-307.

Various applications for the bearing metals and castings manufactured by National Bearing Metals Corp. are described in new Bulletin Af-338.

Downmetal Data Book. Dow Chemical Co. Bulletin Ee-215.

44-page booklet on copper and copper alloys. Revere Copper & Brass Co. Bulletin Ke-239.

Applications of Ampco Metal, an aluminum bronze alloy. Ampco Metal, Inc. Bulletin Ke-175.

Aluminum pistons and cylinder heads. Aluminum Co. of America. Bulletin De-54.

An attractive new 35-page booklet describes Hobart Brothers Co. line of arc welders and accessories. Bulletin Af-20.

Bronze Welding. 16-page booklet by Bridgeport Brass Co. Bulletin He-163.

National Cylinder Gas Co. has issued new circular describing features of the two-stage "Regulator" for producing a non-fluctuating welding flame. Bulletin Af-331.

50-page plastic bound book showing products of Air Reduction Sales Co. Bulletin Ld-69.

Electrode quantity and welding time graph. Arcos Corp. Bulletin Ld-191.

New low temperature welding alloys. Eutectic Welding Alloys, Inc. Bulletin Be-301.

Thermit welding process and applications. Metal & Thermit Corp. Bulletin Ke-64.

Brazing Alloys. Handy & Harman. Bulletin Ke-126.

Oxy-acetylene welding and cutting equipment and processes. Linde Air Products Co. Bulletin Ge-63.

Brazing in the Ajax-Hultgren electric salt bath furnace. Ajax Electric Co. Bulletin Ke-43.

Film and plate processing equipment for spectro analysis is described in new leaflet issued by Harry W. Dietert Co. Bulletin Af-198.

A new 8-page folder discussing the uses of gage blocks and optical flats has just been published by George Scherr Co. Bulletin Af-206.

High temperature furnaces, control instruments and specialties for the laboratory. 32-page booklet by Burrell Technical Supply Co. Bulletin Ee-213.

Modern Polishing. Tracy C. Jarrett. Bulletin De-303.

Optical Aids. Bausch & Lomb Optical Co. Bulletin Ce-35.

Pyrometer Controller, Illinois Testing Laboratories, Inc. Bulletin Hb-180.

New condensed catalog provides a convenient listing of the principal items of equipment manufactured by Wheelco Instrument Co. Bulletin Ee-110.

Thermocouple Heads. Claud S. Gordon Co. Bulletin Be-53.

Pocket relationship table. Wilson Mechanical Instrument Co. Bulletin Be-22.

Non-Destructive Testing. Canadian Radium & Uranium Corp. Bulletin Ie-320.

Metallurgical Equipment. Adolph I. Buehler. Bulletin Ke-135.

Testing equipment. Baldwin Southwark Div., Baldwin Locomotive Wks. Bulletin Ne-67.

Automatic Control. Brown Instrument Co. Bulletin Ne-3.

Universal enclosed terminal head. Arklay S. Richards Co. Bulletin Ne-330.

"The Great American Emergency" is the title of a beautiful new booklet by Surface Combustion Corp. describing the heat treatment of the outstanding items of ordnance production. Bulletin Af-51.

Car bottom, recirculating stress relief furnaces are illustrated and described in new leaflet by Mahr Manufacturing Co. Bulletin Af-5.

Eclipse gas-fired forge furnaces are described in Eclipse Fuel Engineering Co. Bulletin Af-226.

20-page booklet on Ranarex instruments for measurement of CO₂ in flue gases, with new text material on the control of furnace atmospheres. Permutit Co. Bulletin Af-339.

General Electric Co.'s new tool room furnaces are described in a new Bulletin Af-60.

Vertical Furnace. Sentry Co. Bulletin Ne-114.

Industrial Furnaces. Drever Co. Bulletin Ke-321.

Salt Bath Furnaces. Upton Electric Furnace Co. Bulletin Ed-266.

Atmosphere Furnaces. Lithium Corp. Bulletin Ie-319.

Armament Furnaces. Lindberg Engineering Co. Bulletin Ee-66.

Heat Treating Furnaces. Holcroft & Co. Bulletin Ee-203.

Conveyor Furnaces. Electric Furnace Co. Bulletin Be-30.

Industrial Carburetors. C. M. Kemp Mfg. Co. Bulletin Ce-219.

Furnace Catalog. American Gas Furnace Co. Bulletin Be-11.

Convected Air Furnace. Despatch Oven Co. Nd-123.

Annealing Furnace. Continental Industrial Engineers, Inc. Bulletin Ne-154.

Turbo-Compressors. Spencer Turbine Co. Bulletin Da-70.

Johnson Gas Appliance Co. catalog describes complete line of burners, furnaces, torches, mixers, valves and blowers. Bulletin He-298.

New Electric Furnace. American Electric Furnace Co. Bulletin Gd-2.

Furnace experience. Filinn & Drefflein Co. Bulletin Be-82.

High Temperature Fans. Michiana Products Corp. Bulletin Hb-81.

Dehumidifier. Pittsburgh Lectrodryer Corp. Bulletin Bd-187.

Convection Furnaces. Hevi Duty Electric Co. Bulletin Ke-44.

Heat treating. Leeds & Northrup Co. Bulletin Ke-46.

Furnaces. Dempsey Industrial Furnace Corp. Bulletin Ke-260.

Teco process of induction hardening. Ohio Crankshaft Co. Bulletin Le-145.

Liquid Carburetor. Park Chemical Co. Bulletin Na-141.

Butterfly Valves for air, gas, steam, and liquids. R-S Products Co. Bulletin Ke-234.

Carburizing Boxes. Pressed Steel Co. Bulletin Ce-269.

Thermonic Generator. Induction Heating Corp. Bulletin Ke-323.

Wall Chart of Heat Treating Information. Chicago Flexible Shaft Co. Bulletin Ne-49.

Shell Hardening. E. F. Houghton & Co. Bulletin Ne-38.

Electric furnaces. Hoskins Mfg. Co. Bulletin He-24.

New 24-page booklet Lumnite for refractory concrete showing use and applications. Atlas Lumnite Cement Co. Bulletin Af-360.

Pilbrico Jointless Firebrick Co. has just issued booklet describing advantages and applications of new refractory material. Bulletin Af-341.

695 Plastic. Basic Refractories, Inc. Bulletin Ke-192.

High-Alumina Brick. Harbison-Walker Refractories Co. Bulletin Ke-324.

Heavy Duty Refractories. Norton Co. Bulletin Ie-88.

Bonding Silica Brick. Charles Taylor Sons Co. Bulletin Ge-218.

Super Refractories Catalog. Carborundum Co. Bulletin Ld-57.

Protective Coatings, Inc., has just published a comprehensive new catalog showing the Tool line of protective coatings against corrosion, abrasion and rust. Bulletin Af-342.

Coronado Tan-A new lustreless synthetic enamel-and other U. S. Government finishes are described in new bulletins issued by Roxalin Flexible Finishes. Bulletin Af-343.

New cleaning process. Oakite Products, Inc. Bulletin De-26.

Rocker barrels. Pangborn Corp. Bulletin Ae-68.

Cadmium Plating. E. I. duPont de Nemours & Co., Inc. Bulletin Hd-29.

New, illustrated factual folder has just been published by Alvey Ferguson Co., showing how various product washing problems were solved by this company. Bulletin Ne-329.

Rust Preventative. Aloxx Corp. Bulletin Nb-212.

Electrochemical Descaling. Bullard-Dunn Process Div., Bullard Co. Bulletin Ge-143.

Two new bulletins describe Fisher Furnace Co.'s wide range of stationary and tilting type crucible melting furnaces for ferrous and non-ferrous metals. Both will prove valuable additions to any foundryman's files. Bulletin Af-195.

Foundry Sand. Titanium Alloy Mfg. Co. Bulletin He-90.

Ingot production. Gathmann Engineering Co. Bulletin Ka-13.

Pit Handbook. Amsler-Morton Co. Bulletin Kd-286.

Columbium. Electro Metallurgical Co. Bulletin Ce-16.

Electric furnaces. Detroit Electric Furnace Div., Kuhlman Electric Co. Bulletin Hd-271.

New 16-page booklet published by American Manganese Steel Div., American Brake Shoe & Foundry Co., describes the basis for the design and alloy analysis of Amso alloy heat treating containers and furnace parts and fixtures. Bulletin Af-9.

X-Ray inspected castings. Electro Alloys Co. Bulletin Ld-32.

Refinery Alloys. Duraloy Co. Bulletin Kd-233.

Mechanite Castings. Mechanite Research Institute of America. Bulletin Ne-165.

Steel Castings. Chicago Steel Foundry Co. Bulletin He-184.

Heat resisting alloys. General Alloys Co. Bulletin D-17.

Pipes and Tubes. Michigan Steel Castings Co. Bulletin Bb-84.

Wire. Callite Tungsten Corp. Bulletin Le-327.

Iron Powders. Moraine Products Div., General Motors Corp. Bulletin Ke-322.

Metal Powders. Metals Disintegrating Co. Bulletin Ee-208a.

Sponge Iron. Ekstrand & Tholand, Inc. Bulletin Kb-202.

New bulletin shows how dust collectors contribute to modern industry and describes the self-contained units manufactured by the Torit Manufacturing Co. Bulletin Af-344.

A big, 48-page catalog describes the complete line of industrial products for efficient air control manufactured by A. Schrader's Son Div., Scovill Mfg. Co., Inc. Bulletin Af-336.

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Armco Official Gives Data on Steel and Scrap Production

Reported by Kurt Siems

Sales Engineer, Cincinnati Milling Machine Co.

Cincinnati Chapter—Bennett Chapple, assistant to the president of the American Rolling Mill Co., and widely known in recent years as the "Old Iron Master" on the Armco radio program, spoke on Dec. 8 at a joint meeting of the Cincinnati Sections of the American Welding Society, the American Society of Tool Engineers and the A.S.M.

Mr. Chapple devoted the first part of his talk to steels and welding and related some very interesting facts and figures.

Steel production in the United States today is larger by far than that of the rest of the world combined. Steel tonnage produced during World War I was 37,000,000 tons a year; by 1929 it had increased to around 57,000,000 tons, and will reach a total for 1941 of around 82,000,000 tons.

Between 1929 and 1939, and in spite of the severe depression which reduced production of steel to 12% of normal in one of those years, the steel industry spent \$1,000,000,000 in improvements.

When dwelling on accomplishments in welding, it was interesting to hear that the first practical large size welding job was that of repairing the old "Leviathan" during the first World War when its machinery had been ruined by the crew apparently beyond repair.

Another interesting figure mentioned by Mr. Chapple was that we shipped to Japan in the last four years the enormous quantity of 16,000,000 tons of scrap. With such tremendous export shipments in recent years, we now find ourselves practically without it and the

Alumnus Discusses Past Experience, Foot Steels

Reported by Dennis J. Carney

Pennsylvania State College

Penn State Chapter—The annual Christmas banquet was held on Dec. 18 in the banquet room of the Hotel State College.

This event was one of the most enjoyable meetings of the year, largely because of the presence of guest speaker Burns George of the Vanadium-Alloys Steel Co. Mr. George, who is a graduate of Penn State in 1922, spoke in an informal manner, beginning with some of his varied college experiences.

He then followed with a fine discussion of tool steel metallurgy. One of the many points brought out by the speaker was the distinct parallelism between the development of tool steels and the development of metallurgy.

At the conclusion of the meeting small gifts were given to the senior class and to the entire staff of the metallurgical department.

steel industry is forced to build specially designed furnaces and manufacture "synthetic" scrap.

Designing, building and putting these furnaces in operation will, unfortunately, take us until the latter part of 1942 to accomplish.

Mr. Chapple could not stress enough the enormous actual and potential production facilities this country possesses, made possible by our type of democratic government, under which free competition, ingenuity, and individual, as well as corporate, efforts can flourish without coercion.

He had no hesitancy about ultimate results, a condition made still more certain of attainment by the absolute unity of the American people now that we are in a fight to the finish.

HERE AND THERE WITH A.S.M. MEMBERS

W. L. KENNICOTT, previously Los Angeles sales manager of McKenna Metals Co., is now at the head office and factory at Latrobe, Pa., in the management of sales and engineering of Kennametal tools and their applications.



W. L. Kennicott

Mr. Kennicott is a graduate metallurgical engineer of the University of Utah, and has had a substantial part in the development of Kennametal. He is a member of the Pittsburgh Chapter, A.S.M.

JOHN G. KURA has been named to the technical staff of Batelle Memorial Institute, Columbus, Ohio, where he has been assigned to metallurgical research.

Mr. Kura attended the University of Pittsburgh and is a graduate of Carnegie Institute of Technology. Prior to joining the Battelle staff he was associated with the Carnegie-Illinois Steel Corp. at Duquesne, Pa.

Mr. Kura is a member of the Columbus Chapter.

Predicts That Moly Steels Will Remain After Emergency

Reported by G. L. White

Editor, Canadian Metals & Metallurgical Industries

Ontario Chapter—A high level of interest in molybdenum high speed steels was demonstrated by the large crowd in attendance at the meeting on Nov. 7, to hear H. J. Staggs of Crucible Steel Co. of America.

Prior to the technical session, a movie was shown through the courtesy of the Industrial Accident Prevention Association, picturing the operations of various services in a British city during an air raid.

In his address, Mr. Staggs outlined the development of molybdenum high speed steels, explained the important role which they are playing in the present emergency, and went into details on proper methods for their heat treatment.

Known for many years, molybdenum high speed steels, up until the present time, have not been adopted as widely as their properties would have warranted. Now in the United States, with the order of the Office of Production Management that large percentages of molybdenum high speed steels must be employed to relieve the acute shortage of tungsten, this group of steels has suddenly attained a new position among tool materials.

On the return of normal conditions of supply, following this period in which industry will have learned the properties and methods of treatment of molybdenum high speed steels, the speaker predicted that these materials will be so popular that shops will continue to use them.

In outlining the heat treatment of the molybdenum high speed steels, Mr. Staggs pointed out that only moderate variations in the temperatures and practices employed with tungsten steel are required. The method for heat treatment of molybdenum high speed steel prepared by a special committee of the Office of Production Management was presented, with the speaker putting special emphasis upon those points which shops should watch most.

EDWARD M. MURPHY, Cleveland Chapter A.S.M., has been appointed division metallurgist for cold-drawn products of American Steel & Wire Co., with headquarters at the company's main office in Cleveland.

Mr. Murphy has worked for the Wire Company since 1920, when he started at the Newburgh Steel Works in Cleveland as a draftsman. He served as an instructor and was assigned to special work at Newburgh Wire Works before being named foreman of the cold roll department at that plant in 1933.

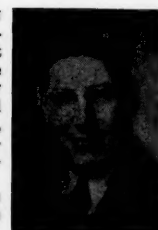
He was made assistant to superintendent at Newburgh Wire Works in 1936, and has remained in that post to the present time.

CARTER C. HIGGINS has been made assistant general sales manager of the Worcester Pressed Steel Co. During the last two years, Mr. Higgins has been acting in the capacity of export manager and in charge of government contract negotiations.

Prior to that, he spent several years in the manufacturing division in various capacities. Mr. Higgins, a member of the Worcester Chapter, is also a director of the Worcester Pressed Steel Co.

E. BINGMAN

R. has been appointed district manager for the Indiana territory by the Jessop Steel Co., Washington, Pa. His headquarters are in Indianapolis.



R. E. Bingman

Mr. Bingman has sold Jessop steels in the Indiana territory since 1939. Previously he was production manager and sales manager for the Imperial Electric Co. He is a member of the Indianapolis Chapter A.S.M. and a graduate of Butler University.

Employment Bureau

Address answers care of A. S. M., 7301 Euclid Ave., Cleveland, unless otherwise stated.

Positions Open

CHEMICAL ENGINEER: Between the ages of 35 and 42 with background as a manufacturing executive in the production of magnesium. Salary \$12,000. Box 1-5.

METALLURGIST: Trained and experienced in heat treatment of steel, with degree in metallurgy. Starting salary about \$275 per month. Ohio. Box 1-10.

CHIEF CHEMIST: Must be trained and experienced in electrochemistry and metals and carbon steel. Must have some executive ability to take charge of laboratory. Salary about \$300 per month. Michigan. Box 1-15.

INSPECTORS: The U.S. Civil Service Commission has announced an examination for inspector positions in the Defense Production Protective Service of the War Department. Salaries \$2600 to \$5600 a year; applications accepted until further notice. No written test will be given. Announcement and application forms may be obtained at first or second-class post offices or from the Civil Service Commission in Washington, D. C.

Positions Wanted

HEAT TREAT SUPERVISOR: Eight years' experience in modern ferrous and non-ferrous aircraft heat treating shops. Desires supervisory position with firm which can offer reasonable assurance of continued employment after the emergency. Box 1-25.

METALLURGICAL ENGINEER: Desires position in metallurgical or heat treatment department. Experienced in heat treatment of ferrous alloys. Eastern United States, preferably New York State. Available on short notice. Box 1-20.

Dr. Edgar C. Bain

Assistant to the Vice-President of the United States Steel Corporation

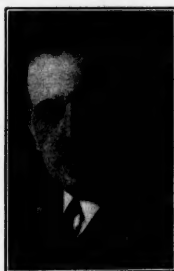
PRESENTS

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Dr. Bain has been assistant to the vice-president of U. S. Steel Corp. since 1935, having spent the preceding seven years in the Corporation's research laboratory where he inaugurated and carried through a program of research which has revolutionized the classical concept of steel metallurgy.

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Campbell Fellowships Are Announced at Columbia

Through the bequest of the late William Campbell, for many years Howe Professor of Metallurgy at Columbia University, two fellowships have been established. They are awarded primarily for graduate study and research in the field of metallurgy.

The stipend of each Campbell Fellowship is fixed at the time of award by recommendation of the Campbell Fellowship Committee and will normally be an amount sufficient to meet the necessary living expenses of the incumbent of the fellowship.

Applications accompanied by certified transcripts of academic records, statements of proposed research projects and proposed fields of graduate studies should be filed with the secretary of the University before March 1, 1942. Practical experience in metallurgy or previous graduate study is desirable.

Application blanks and announcements will be forwarded to interested persons by the secretary of the University on request. For other information write to Prof. Eric R. Jette, School of Mines, Columbia University.

Milwaukee Concludes Lecture Course on Physical Metallurgy



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Senior Student Describes Experience in Casting Al

Reported by I. J. Levinson

Michigan College of Mining and Technology

Michigan College of Mining and Technology Chapter—"The Casting of Aluminum" was the title of the talk given by Raymond Amala, senior metallurgy student, before the last meeting of the fall term.

Mr. Amala, who spent the two previous summers working at the Detroit plant of the Aluminum Co. of America, discussed the various types of casting employed at the plant, laying most stress on green and dry sand methods. Aluminum alloys applicable to casting and heat treating were described and outlined as to their uses.

At the close of his talk, Mr. Amala answered questions pertaining to sand control, casting defects, pouring methods, and grain size control.

At the meeting plans were laid for the erection of a snow statue by the Society in accordance with the annual Winter Carnival held by the school. Chairman Norman Kates appointed Lee Graves, Edward Mackiewicz and Robert Dorr to act as a "Statue Committee".

Talk on Practical Applications by E. S. Rowland Features Regular December Meeting

Milwaukee Chapter—E. S. Rowland, research metallurgist, Timken Roller Bearing Co., concluded the Chapter's educational program on "Fundamentals of Physical Metallurgy" with a lecture on the "Practical Applications of Physical Metallurgy" as a feature of the regular December meeting.

Dr. Rowland discussed a number of practical problems such as grain size, critical temperatures, hardenability, etc., involving concepts of physical metallurgy. Explanations were given pertinent to the limitations of an accurate knowledge of the effects of these variables.

A rather complete discussion on the method of obtaining accurate critical temperatures was of interest.

The measurement of chemical heterogeneity by means of a "segregation factor" and the effects on sub-critical transformation was predicted as having potential value.

The previous evening lectures in the educational course are outlined below.

Nov. 3—Alloy Equilibrium and the Iron-Carbon Diagram; John E. Schoen, professor and head, Department of Mechanical Engineering, Marquette University.
Nov. 10—Metallographic Structures and Their Interpretation; J. F. Oesterle, chairman, Department of Mining and Metallurgy, University of Wisconsin.
Nov. 17—Alloying Elements and the Effective Substitution Thereof; E. J. Wellauer, research engineer, The Falk Corp.
Nov. 24—Non-Ferrous Alloys; H. L. Smith, chief metallurgist, Federated Metals Div., American Smelting & Refining Co.
Dec. 1—High Alloy Metals; W. J. Jackel, metallurgist, A. O. Smith Corp.

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CHAPTER CALENDAR

CHAPTER	DATE	PLACE	SPEAKER	SUBJECT
Boston	Feb. 6	Room 6-120 M.I.T.	A. Dudley Bach	Some Practical Suggestions on Steel Selection and Heat Treatment
Buffalo	Feb. 5	Hotel Buffalo	B. L. McCarthy	Color Metallography
Buffalo	Feb. 7			Eighth Annual Dance
Calumet	Feb. 17	Woodmar Country Club, Hammond, Ind.	H. L. von Ende	Deep Drawing and Stamping
Canton-Mass.	Feb. 20			Mid-Winter Party
Chicago	Feb. 12	Chicago Bar Assoc.	A. B. Kinzel	Intelligent Inspection
Cleveland	Feb. 2	Cleveland Club	George K. Dreher	Rearmament Bronzes
Dayton	Feb. 11	Engineers Club	L. P. Wood	Functions of the Laboratory in Aircraft Manufacture
Detroit	Feb. 9	Engineers Bldg.	R. L. Heath	Metallurgy in Aircraft Engine Production
Golden Gate	Feb. 16		Serge Kovaleff	Modern Diesel Engines
Hartford	Feb. 10	Hartford Electric Light Co.	A. Allan Bates	Plastics Vs. Metals
Indianapolis	Feb. 16	Washington Hotel	J. D. Armour	Machinability
Lehigh Valley	Feb. 6	Hotel Traylor, Allentown, Pa.	G. B. Waterhouse	The OPM (Annual Stoughton Night)
Los Angeles	Feb.		E. Bruce	Materials and Design of the Messerschmidt
Milwaukee	Feb. 17	Milwaukee Athletic Club	George K. Dreher	Rearmament Bronzes
Montreal	Feb. 2	Windsor Hotel	J. E. Morrison	Asbestos Products
New Haven	Feb. 19	Hammond Laboratory, Yale University	A. O. Schaefer	Testing and Inspection
New York	Feb. 9	Bldg. Trade Employers Assoc. Club Room	George A. Sands	Metallurgical Problems in Chemical Engineering
North West	Feb. 16	Coffman Memorial Union, Univ. of Minn.	John Goodwin	Industrial Uses of Copper Alloys
Notre Dame	Feb. 11	Engineering Auditorium, Univ. of Notre Dame	B. H. Booth	Silvery Pig Iron
Ontario	Feb. 6	Toronto	E. E. Thum	Strategic Metals and Their Substitutes
Peoria	Feb. 9		J. C. Drapeau, Jr.	Powdered Metals
Philadelphia	Feb. 27	Franklin Institute	H. W. Gillett	Sauveur Night
Pittsburgh	Feb. 12	Roosevelt Hotel	Rufus E. Zimmerman	National Defense Subject
Rhode Island	Feb. 4		Walter M. Saunders, Jr.	Hardenability Testing
Rochester	Feb. 9	Chamber of Commerce	Paul V. Faragher	Aluminum in National Defense
Rockford	Feb.	Hotel Faust		Joint Meeting With Engineering Council
Saginaw Valley Group	Feb. 17	Bancroft Hotel, Saginaw, Mich.	O. J. Horger	Fatigue Analysis and Photo-Elastic Studies
Springfield	Feb. 9		E. S. Patch	Powder Metallurgy
Syracuse	Feb. 3	Onondaga Hotel	Walter Crafts	Ferro-Alloys
Toledo Group	Feb. 23	Hillcrest Hotel	L. Grimshaw and R. Kells	Current Tool Steel Trends
Tri-City	Feb. 10	Hotel Ft. Armstrong, Rock Island, Ill.	Roy Roshong	Tool Hardening Practice
Worcester	Feb. 11	Sanford Riley Hall, W.P.I.	A. Dudley Bach	Steel Selection and Heat Treatments
York	Feb. 11	York, Pa.	R. G. McElwee	Modern Cupola Cast Iron

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If any member wants to keep his copies of the issues of Vol. XXIX, March through December, 1941, in loose form and yet have a bound volume for his library, a complete bound volume will be supplied for \$5, postpaid.

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